

International Journal of EARTHQUAKE ENGINEERING and STRUCTURAL DYNAMICS

The Journal of the International Association for Earthquake Engineering

General Editor:

Professor Ray W. Clough, Department of Civil Engineering, Davis Hall, University of California, Berkeley, California, 94720, U.S.A.

Associate Editor:

Professor Geoffrey B. Warburton, Department of Mechanical Engineering, University of Nottingham, University Park, Nottingham NG7 2RD.

Advisory Editorial Board:

Dr. NICOLAS N. AMBRASEYS,
Imperial College of Science and Technology,
University of London,
London S.W.7.

Professor J. H. ARGYRIS,
Direktor, Institut für Statik und Dynamik der Luft- und
Raumfahrtkonstruktionen,
Stuttgart 80, Pfaffenwaldring 27
Deutschland.

Dr. ARTURO ARIAS,
Professor of Structural Engineering,
University of Chile,
Santiago, Chile.

Dr. J. FERRY BORGES,
National Laboratory of Civil Engineering,
Avenida do Brasil,
Lisbon 5, Portugal.

Professor A. G. DAVENPORT,
Faculty of Engineering Science,
The University of Western Ontario,
London 72, Ontario, Canada.

Dr. LUIS ESTEVA,
Institute of Engineering,
University of Mexico,
Mexico 20, D.F., Mexico.

Dr. RODRIGO FLORES,
Professor of Structural Engineering
University of Chile,
Santiago, Chile.

Dr. GEORGE W. HOUSNER,
President, International Association for Earthquake
Engineering and Professor of Civil Engineering,
California Institute of Technology,
Pasadena, California, 91109, U.S.A.

Mr. D. A. HOWELLS,
Howard Humphreys & Sons,
London.

Dr. PAUL C. JENNINGS,
Professor of Applied Mechanics,
California Institute of Technology,
Pasadena, California, 91109, U.S.A.

Dr. JAI KRISHNA,
Vice Chancellor,
University of Roorkee,
Roorkee, U.P., India.

Dr. J. KAZUO MINAMI,
Secretary, IAEE, c/o International Institute of Seismology
and Earthquake Engineering,
Tokyo, Japan.

Dr. KIYOSHI MUTO,
President, Muto Institute of Structural Mechanics,
Tokyo, Japan.

Dr. NATHAN M. NEWMARK,
Chairman, Department of Civil Engineering,
University of Illinois,
Urbana, Illinois, U.S.A.

Dr. SHUNZO OKAMOTO,
University of Tsukuba,
Shimo-Okubo 255,
Utsunomiya-City, Japan.

Professor JOSEPH PENZIEN,
Director, Earthquake Engineering Research Centre
University of California,
Berkeley, California, U.S.A.

Dr. S. V. POLIAKOV,
Deputy Director of TsNISK,
Gostroy of the U.S.S.R.,
Moscow, U.S.S.R.

Professor FRANK RICHART,
Department of Civil Engineering,
University of Michigan,
Ann Arbor, Michigan, U.S.A.

Mr. JOHN E. RINNE,
Vice President, Earl and Wright Engineers,
San Francisco, California, 94105, U.S.A.

Mr. KARL V. STEINBRUGGE,
Pacific Fire Rating Bureau,
San Francisco, California, 94106, U.S.A.

Professor O. C. ZIENKIEWICZ,
Department of Civil Engineering,
University College of Swansea,
Singleton Park,
Swansea, SA2 8PP.



JOHN WILEY & SONS

London · New York · Sydney · Toronto

A Wiley-Interscience Publication

Copyright © 1973 John Wiley & Sons Ltd. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical photocopying, recording or otherwise, without the prior written permission of the Copyright owner.

Printed in Great Britain by John Wright & Sons Ltd., at the Stonebridge Press, Bristol

CONTENTS

Volume 1, Issue Nos. 1-4
International Journal of

EARTHQUAKE ENGINEERING AND STRUCTURAL DYNAMICS

Issue No. 1, JULY-SEPTEMBER 1972

Editorial	3
G. W. Housner and P. C. Jennings: The San Fernando California Earthquake	5
K. Muto: Dynamic Response of the KII Building to the San Fernando Earthquake	33
G. B. Warburton and J. Higgs: Vibration of Cylindrical Shells with Clamped Ends	45
J. Penzien and M. K. Kaul: Response of Offshore Towers to Strong Motion Earthquakes	55
R. N. Iyengar and M. Shinozuka: Effect of Self-Weight and Vertical Acceleration on the Behaviour of Tall Structures During Earthquake	69
T. Hisada, N. Ohmori and S. Bessho: Earthquake Design Considerations in Reinforced Concrete Columns	79
D. J. Johns, J. Britton and G. Stoppard: On Increasing the Structural Damping of a Steel Chimney	93
IAEE News, Statement from the President, G. W. Housner	101

P. C. Jennings, R. B. Matthiesen and J. Brent Hoerner: Forced Vibration of a Tall Steel-Frame Building	107
M. D. Trifunac: Comparisons Between Ambient and Forced Vibration Experiments	133
A. K. Chopra and P. Chakrabarti: The Earthquake Experience at Koyna Dam and Stresses in Concrete Gravity Dams	151
R. Davis, R. D. Henshell and G. B. Warburton: Curved Beam Finite Elements for Coupled Bending and Torsional Vibration	165
D. R. B. Webb: Measurements of Sonic Boom Responses of Structures Due to Concorde	177
A. Selby and R. T. Severn: An Experimental Assessment of the Added Mass of Some Plates Vibrating in Water	189

Issue No. 3, JANUARY-MARCH 1973

S. S. Tezcan and M. Ipek: Long Distance Effects of the 28 March 1970 Gediz Turkey Earthquake	203
T. A. Wyatt and H. I. May: The Generation of Stochastic Load Functions to Simulate Wind Loading of Structures	217
S. S. Saini, J. Krishna and A. R. Chandrasekaran: Aseismic Strength of Kolkewadi Dam	225
E. L. Wilson, I. Farhoomand and K. J. Bathe: Nonlinear Dynamic Analysis of Complex Structures	241
S. Okamoto and C. Tamura: Behaviour of Subaqueous Tunnels During Earthquakes.	253
M. D. Trifunac: Scattering of Plane SH Waves by a Semi-Cylindrical Canyon	267
K. J. Bathe and E. L. Wilson: Stability and Accuracy Analysis of Direct Integration Methods	283
E. Faccioli: A Stochastic Model for Predicting Seismic Failure in a Soil Deposit	293
IAEE News	308

Issue No. 4, APRIL-JUNE 1973

R. Shepherd: Multiphase Cross Bracing in Earthquake Resistant Structures	311
P. Chakrabarti and A. K. Chopra: Hydrodynamic Pressures and Response of Gravity Dams to Vertical Earthquake Component	325
S. F. Masri and A. M. Ibrahim: Stochastic Excitation of a Simple System with Impact Damper	337

	413
A. K. Chopra, D. P. Clough and R. W. Clough: Earthquake Resistance of Buildings with a 'Soft' First Storey	347
J. W. Smith: Finite Strip Analysis of the Dynamic Response of Beam and Slab Highway Bridges . .	357
J. Glück: The Vibration Frequencies of an Elastically Supported Cantilever Column with Variable Cross-Section and Distributed Axial Load	371
P. R. Mukherjee and A. Coull: Free Vibrations of Coupled Shear Walls	377
P. C. Jennings and K. S. Skattum: Dynamic Properties of Planar, Coupled Shear Walls	387
O. C. Zienkiewicz and R. W. Lewis: An Analysis of Various Time-Stepping Schemes for Initial Value Problems	407
Table of Contents, Volume 1	411
Author Index	415

327	A. K. Chopra, D. R. Chopra, and R. W. Clough: Earthquake Resistance of Buildings with a Soft First Story
337	J. W. Smith: Finite Strip Analysis of the Dynamic Response of Beam and Slab Highway Bridges
347	J. Elmer: The Vibration Properties of an Elastically Supported Cantilever Column with Elastic End Restraints
357	R. H. Muthuswamy and A. Gouni: Free Vibration of Coupled Shear Walls
367	R. C. Jennings and R. S. Stannett: Dynamic Response of Frames, Coupled Shear Walls, and Diaphragms
377	D. C. Zekris and R. W. Clough: An Analysis of Viscous Time-Dependent Seismicity for Earthquake Engineering
387	Table of Contents, Volume 1
397	Author Index

407	J. W. Smith: Finite Strip Analysis of the Dynamic Response of Beam and Slab Highway Bridges
417	J. Elmer: The Vibration Properties of an Elastically Supported Cantilever Column with Elastic End Restraints
427	R. H. Muthuswamy and A. Gouni: Free Vibration of Coupled Shear Walls
437	R. C. Jennings and R. S. Stannett: Dynamic Response of Frames, Coupled Shear Walls, and Diaphragms
447	D. C. Zekris and R. W. Clough: An Analysis of Viscous Time-Dependent Seismicity for Earthquake Engineering
457	Table of Contents, Volume 1
467	Author Index

477	J. W. Smith: Finite Strip Analysis of the Dynamic Response of Beam and Slab Highway Bridges
487	J. Elmer: The Vibration Properties of an Elastically Supported Cantilever Column with Elastic End Restraints
497	R. H. Muthuswamy and A. Gouni: Free Vibration of Coupled Shear Walls
507	R. C. Jennings and R. S. Stannett: Dynamic Response of Frames, Coupled Shear Walls, and Diaphragms
517	D. C. Zekris and R. W. Clough: An Analysis of Viscous Time-Dependent Seismicity for Earthquake Engineering
527	Table of Contents, Volume 1
537	Author Index

AUTHOR INDEX, VOLUME 1

- Bathe, K. J., and Wilson, E. L.: Stability and accuracy analysis of direct integration methods, 283; see Wilson, E. L., 241
- Bessho, S.: see Hisada, T., 79
- Britton, J.: see Johns, D. J., 93
- Chakrabarti, P., and Chopra, A. K.: Hydrodynamic pressures and response of gravity dams to vertical earthquake component, 325; see Chopra, A. K., 151
- Chandrasekaran, A. R.: see Saini, S. S., 225
- Chopra, A. K., and Chakrabarti, P.: The earthquake experience at Koyna Dam and stresses in concrete gravity dams, 151
- Chopra, A. K., Clough, D. P., and Clough, R. W.: Earthquake resistance of buildings with a 'soft' first storey, 347; see Chakrabarti, P., 325
- Clough, D. P.: see Chopra, A. K., 347
- Clough, R. W.: see Chopra, A. K., 347
- Coull, A.: see Mukherjee, P. R., 377
- Davis, R., Henshell, R. D., and Warburton, G. B.: Curved beam finite elements for coupled bending and torsional vibration, 165
- Faccioli, E.: A stochastic model for predicting seismic failure in a soil deposit, 293
- Farhoomand, I.: see Wilson, E. L., 241
- Glück, J.: The vibration frequencies of an elastically supported cantilever column with variable cross-section and distributed axial load, 371
- Henshell, R. D.: see Davis, R., 165
- Higgs, J.: see Warburton, G. B., 45
- Hisada, T., Ohmori, N., and Bessho, S.: Earthquake design considerations in reinforced concrete columns, 79
- Hoerner, J. B.: see Jennings, P. C., 107
- Housner, G. W. and Jennings, P. C.: The San Fernando California earthquake, 5
- IAEE News, Statement from the President, G. W. Housner, 101
- Ibrahim, A. M.: see Masri, S. F., 337
- Ipek, M.: see Tezcan, S. S., 203
- Iyengar, R. N., and Shinozuka, M.: Effect of self-weight and vertical acceleration on the behaviour of tall structures during earthquake, 69
- Jennings, P. C., Matthieson, R. B., and Hoerner, J. B.: Forced vibration of a tall steel-frame building, 107
- Jennings, P. C., and Skattum, K. S.: Dynamic properties of planar, coupled shear walls, 387; see Housner, G. W., 5
- Johns, D. J., Britton, J., and Stoppard, G.: On increasing the structural damping of a steel chimney, 93
- Kaul, M. K.: see Penzien, J., 55
- Krishna, J.: see Saini, S. S., 225
- Lewis, R. W.: see Zienkiewicz, O. C., 407
- Masri, S. F., and Ibrahim, A. M.: Stochastic excitation of a simple system with impact damper, 337
- Matthieson, R. B.: see Jennings, P. C., 107
- May, H. I.: see Wyatt, T. A., 217
- Mukherjee, P. R., and Coull, A.: Free vibrations of coupled shear walls, 377
- Muto, K.: Dynamic response of the KII building to the San Fernando earthquake, 33
- Ohmori, N.: see Hisada, T., 79
- Okamoto, S., and Tamura, C.: Behaviour of subaqueous tunnels during earthquakes, 253
- Penzien, J., and Kaul, M. K.: Response of offshore towers to strong motion earthquakes, 55
- Saini, S. S., Krishna, J., and Chandrasekaran, A. R.: Aseismic strength of Kolkewadi Dam, 225
- Selby, A., and Severn, R. T.: An experimental assessment of the added mass of some plates vibrating in water, 189
- Severn, R. T.: see Selby, A., 189
- Shepherd, R.: Multiphase cross bracing in earthquake resistant structures, 311
- Shinozuka, M.: see Iyengar, R. N., 69
- Skattum, K. S.: see Jennings, P. C., 387
- Smith, J. W.: Finite strip analysis of the dynamic response of beam and slab highway bridges, 357
- Stoppard, G.: see Johns, D. J., 93
- Tamura, C.: see Okamoto, S., 253
- Tezcan, S. S., and Ipek, M.: Long distance effects of the 28 March 1970 Gediz Turkey earthquake, 203
- Trifunac, M. D.: Comparisons between ambient and forced vibration experiments, 133
- Trifunac, M. D.: Scattering of plane SH waves by a semi-cylindrical canyon, 267
- Warburton, G. B., and Higgs, J.: Vibration of cylindrical shells with clamped ends, 45; see Davis, R., 165
- Webb, D. R. B.: Measurements of sonic boom responses of structures due to Concorde, 177
- Wilson, E. L., Farhoomand, I., and Bathe, K. J.: Nonlinear dynamic analysis of complex structures, 241; see Bathe, K. J., 283
- Wyatt, T. A., and May, H. I.: The generation of stochastic load functions to simulate wind loading of structures, 217
- Zienkiewicz, O. C., and Lewis, R. W.: An analysis of various time-stepping schemes for initial value problems, 407

